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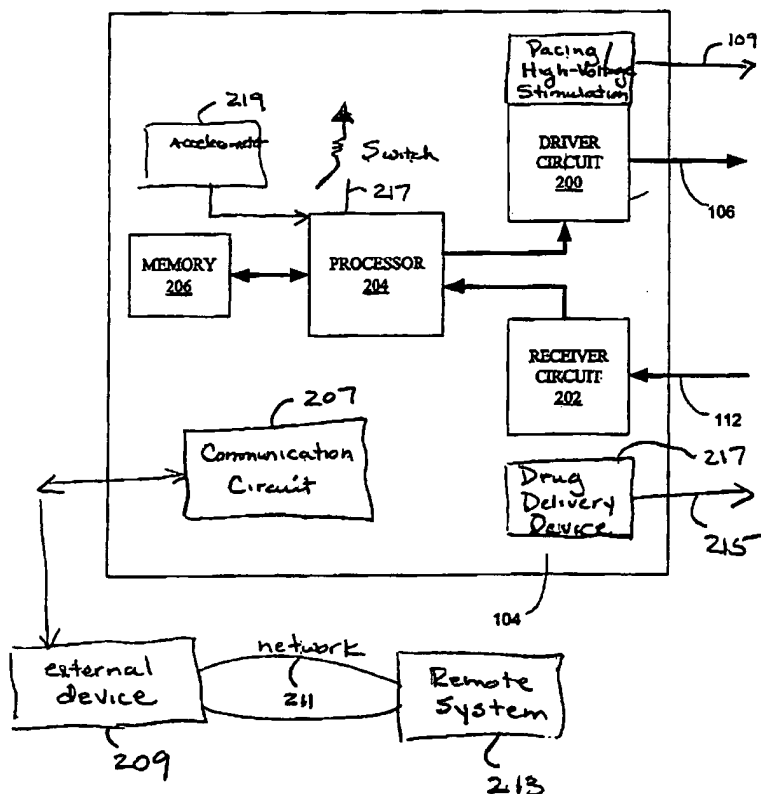
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| <p>(51) International Patent Classification⁷: A61N 1/36, 1/365</p> <p>(21) International Application Number: PCT/US01/45698</p> <p>(22) International Filing Date: 26 October 2001 (26.10.2001)</p> <p>(25) Filing Language: English</p> <p>(26) Publication Language: English</p> <p>(30) Priority Data:
60/243,393 26 October 2000 (26.10.2000) US</p> <p>(71) Applicant: MEDTRONIC, INC. [US/US]; 710 Medtronic Parkway N.E., Minneapolis, MN 55432 (US).</p> <p>(72) Inventors: HILL, Michael, R., S.; 3928 Washburn Avenue South, Minneapolis, MN 55304 (US). KING, Gary, W.; 1319 Hillcrest Drive Northeast, Fridley, MN 55432 (US). MULLEN, Thomas, J.; 2033 135th Lane Northeast,</p> | <p>Ham Lake, MN 55304 (US). ZHOU, Xiaohong; 17715 45th Avenue North, Plymouth, MN 55446 (US). MEHRA, Rahul; 4980 Neal Avenue North, Stillwater, MN 55082 (US).</p> <p>(74) Agents: McMAHON, Beth, L. et al.; Medtronic, Inc. LC340, 710 Medtronic Parkway N.E., Minneapolis, MN 55432 (US).</p> <p>(81) Designated States (<i>national</i>): CA, JP.</p> <p>(84) Designated States (<i>regional</i>): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).</p> <p>Published:
— <i>with international search report</i></p> <p>(88) Date of publication of the international search report:
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[Continued on next page]

(54) Title: METHOD AND APPARATUS TO MINIMIZE THE EFFECTS OF A CARDIAC INSULT



(57) Abstract: A method and apparatus are provided for protecting cardiac tissue from insult. The method comprises identifying the occurrence of an insult, such as a heart attack, and delivering electrical stimulation to one or more predetermined nerves in a patient's body in response to identifying the occurrence of the insult. The stimulation may be provided to peripheral nerves, intrinsic cardiac nerves, sympathetic ganglia, cranial nerves, and may generally be directed to the vertebral column, or within the chest wall of the patient.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/45698

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A61N1/36 A61N1/365

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 688 577 A (PACESETTER AB) 27 December 1995 (1995-12-27) the whole document ---	27, 28, 30, 32, 34, 55-58
X	US 6 134 470 A (HARTLAUB JEROME T) 17 October 2000 (2000-10-17) cited in the application the whole document ---	25-28, 30, 32, 34, 55-58
X	US 5 824 021 A (RISE MARK T) 20 October 1998 (1998-10-20) cited in the application the whole document ---	25-28, 30, 32, 34, 55-58

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
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- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

5 July 2002

Date of mailing of the international search report

15/07/2002

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/45698

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 058 331 A (KING GARY W) 2 May 2000 (2000-05-02) cited in the application the whole document ----	25,26, 28, 30-32, 55,56,58
X	US 5 058 584 A (BOURGEOIS IVAN) 22 October 1991 (1991-10-22) cited in the application the whole document ----	25,26, 28,30, 32,55, 56,58
X	US 5 199 428 A (BOURGEOIS IVAN ET AL) 6 April 1993 (1993-04-06) cited in the application the whole document -----	25,26, 28,30, 32,55, 56,58

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/45698

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 1-24, 35-54
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/45698

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0688577	A	27-12-1995	EP 0688577 A1	27-12-1995
			JP 8038626 A	13-02-1996
US 6134470	A	17-10-2000	WO 0027474 A1	18-05-2000
US 5824021	A	20-10-1998	NONE	
US 6058331	A	02-05-2000	EP 1075307 A1	14-02-2001
			WO 9955413 A1	04-11-1999
US 5058584	A	22-10-1991	DE 69105140 D1	15-12-1994
			DE 69105140 T2	13-04-1995
			EP 0546024 A1	16-06-1993
			JP 2929316 B2	03-08-1999
			JP 6500715 T	27-01-1994
			WO 9204075 A1	19-03-1992
US 5199428	A	06-04-1993	AU 648167 B2	14-04-1994
			AU 1647992 A	21-10-1992
			CA 2076384 A1	23-09-1992
			DE 69223703 D1	05-02-1998
			DE 69223703 T2	16-07-1998
			DE 69225813 D1	09-07-1998
			EP 0530354 A1	10-03-1993
			EP 0721786 A2	17-07-1996
			JP 2620819 B2	18-06-1997
			JP 6502571 T	24-03-1994
			WO 9216257 A1	01-10-1992